

gestive organs, being evidently a provision for their early or premature exercise.

From the close resemblance in the structures of the ovary and Fallopian tubes of the kangaroo with those of ordinary mammalia, and from the circumstance of the young being nourished, after birth, by a secretion from mammary glands, the author concludes that the ovulum in the former animal quits the ovisac in a condition corresponding to that in the latter class, and increases in a similar manner as it descends to the uterus. But as there is no formation of a placenta, it remains to be determined how the aeration of the foetal blood is effected: this, however, probably takes place through the chorion, although this membrane is not vascular, to an extent sufficient for the purposes of the vital functions of a foetus so imperfect, and whose uterine existence is of such short duration, as they are in this animal. Reasons are given, which render it probable that in the Marsupiaata an allantois and umbilical arteries are developed at a later period of gestation, corresponding in this respect to the foetal condition of the Batrachian reptiles, and corroborating the views entertained by the author, that the former family are essentially ovo-viviparous.

The author next proceeds to investigate the structure and condition of the mammary foetus in the Marsupiaata, or that stage of its existence when it is retained in the marsupial pouch, and derives its sustenance from the imbibition of milk from the mammary glands. He relates the observations which he has lately made on the foetus of a kangaroo in the Menagerie of the Zoological Society. He ascertained that the period of uterine gestation in the animal is thirty-nine days, and examined the foetus a few hours after it had fixed itself to the nipple in the abdominal pouch, and when it was not much above an inch in length, and resembled an earth-worm, both in the colour and the semi-transparency of its integument. Four days afterwards, he detached it from the nipple, and observed that although it moved its limbs freely, it was unable to regain its former situation. The parent endeavoured to replace it by introducing its head into the pouch, which it held open with its fore paws; but these efforts were ineffectual, and the next day the foetus had disappeared, having, probably, been destroyed by the mother.

The last section of the paper is occupied by an inquiry into the structure and analogies of the female generative organs of the Marsupiaata. These are traced throughout the successive orders of mammalia, to their connexions with various tribes of birds and reptiles, and is concluded by a disquisition on the final purposes of marsupial generation, and its relations to the other modes by which the continuance of the race is accomplished, in the more elevated orders of animals, and which appear to have reference to the greater expansion and perfection of the brain, and the greater development of the intellectual faculties.

A paper was then read, entitled, "On a new Law of Combustion." By Charles J. B. Williams, M.D. Communicated by W. G. Maton, M.D., F.R.S.

The principal object of this paper is to prove that most combustible bodies undergo a kind of combustion, attended with light and heat, at a temperature considerably below that usually assigned as their point of ignition. This fact has been already noticed with regard to phosphorus and sulphur; and the pale blue flame produced in the vapour of ether by a hot palladium or platina wire, before the wire itself becomes vividly ignited, is another instance of the same general law, which the author finds applicable to all compound, and a few of the simple inflammable bodies. Of these he gives a variety of examples among oleaginous, resinous, and carbonaceous products, both animal and vegetable, which, when thrown on a hot iron, exhibit a pale and faintly luminous flame. Those on the other hand which are very volatile, such as camphor, the essential oils, ether and alcohol, rise in vapour before they reach the temperature necessary for their combustion; but they may be made to exhibit the same phenomena, by directing their vapour against a body heated below redness. The contact of pure oxygen gas immediately heightens the intensity of the light and heat evolved on these occasions, and excites them into a more decided and vivid combustion.

The author next adverts to the nature of the products of this low form of combustion, which, in organic substances, appear to him to form an intermediate link between those of open combustion, and those of fermentation and putrefaction. He considers the phenomena he has described as confirming the truth of a law he formerly announced, namely, that "the evolution of heat during chemical change is, *cæteris paribus*, proportionate to the degree of change from isolation, or weak combination, towards firm and simple union." He thinks they will afford an explanation of many cases of spontaneous combustion, which have hitherto been involved in mystery; such as that of porous combustible matters, as oily cotton, tow, or wool, when accumulated in considerable quantities, in places protected from cooling, or where air has limited access; and also of heaps of coal or charcoal, of pyrophori and pyrites; and the same principles may perhaps also account for the phenomena of the spontaneous combustion of the human body which are on record.

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May 8th, 1834.

FRANCIS BAILY, Esq., Vice-President, in the Chair.

A paper was read, entitled, "On the Connexion between Refracted and Diffracted Light." By Paul Cooper, Esq. Communicated by J. G. Children, Esq., Sec. R.S.

The purport of the present paper, as stated by the author, is to connect the phenomena of the dispersion of light arising from refraction, with that consequent upon diffraction, by showing, 1st, "that white refracted light is formed by the superposition of fringes of colours, or rays of light uniformly refracted, which compensate each other in succession; 2nd, that diffracted white light is formed by the superpo-